A U S H A N G

FREIE UNIVERSITÄT BERLIN

Fachbereich Mathematik und Informatik

Promotionsbüro, Arnimallee 14, 14195 Berlin

D I S P U T A T I O N

Montag, 16.10.2023, 14:00 Uhr

Ort: Seminarraum 007/008

(Fachbereich Mathematik und Informatik, Arnimallee 6, 14195 Berlin)

Disputation über die Doktorarbeit von

Frau Sara Hetzel

Thema der Dissertation:

Investigation of DNA methylation heterogeneity in cancer

Thema der Disputation:

Quantification of DNA methylation heterogeneity from bulk sequencing data

Die Arbeit wurde unter der Betreuung von **Prof. Dr. K. Reinert** durchgeführt.

Abstract: Methylation of cytosines in the CpG context is linked to the regulation of many biological processes in mammalian cells, including genome stability, transcriptional regulation, and X chromosome inactivation. To date, treatment with sodium bisulfite that converts unmethylated cytosines to uracils followed by high-throughput sequencing represents the gold standard for profiling this epigenetic modification. The technique is commonly used to measure average DNA methylation rates per CpG across the underlying cell population. However, potential heterogeneity between single cells within the population cannot be distinguished based on average methylation profiles. To overcome this limitation, several metrics have been developed that assess single-molecule DNA methylation patterns and thereby quantify heterogeneity from bulk bisulfite sequencing experiments. These metrics use individual sequencing reads as an approximation for local single-cell measurements, which offers an additional layer of information based on already available data sets. In this disputation talk, I will briefly introduce different biological sources of DNA methylation heterogeneity and a selection of commonly used read-level DNA methylation metrics that aim to identify them. Afterwards, the main focus will be on the comparison of different metrics with respect to the susceptibility to technical biases and their performance in detecting simulated heterogeneous regions.

Die Disputation besteht aus dem o. g. Vortrag, danach der Vorstellung der Dissertation einschließlich jeweils anschließenden Aussprachen.

Interessierte werden hiermit herzlich eingeladen

Der Vorsitzende der Promotionskommission
Prof. Dr. K. Reinert